Raytheon Iridium® Capability and Operations Manual

Raytheon Technical Services Company, LLC
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1. PURPOSE

1.1. Overview. The purpose of this manual is to define the procedures required to configure and operate the Iridium® capabilities for the AN/TMQ-53 Tactical Meteorological Observation System (TMOS).

1.2. System Architecture. The AN/TMQ-53 provides real-time weather data, via radio modem, or direct line communications, to the laptop running AOS software. METAR and SPECI reports are generated and transmitted via the Iridium® Modem to the Iridium® Satellite Constellation. The site-generated weather observation is transmitted across the Iridium® constellation until it reaches the DoD Iridium® Gateway location in Wahiawa, Hawaii. From Hawaii, the weather observation travels via NIPRNET to the Weather Product Management Distribution Server (WPMDS) at Air Force Weather Agency (AFWA) (see Figure 1).

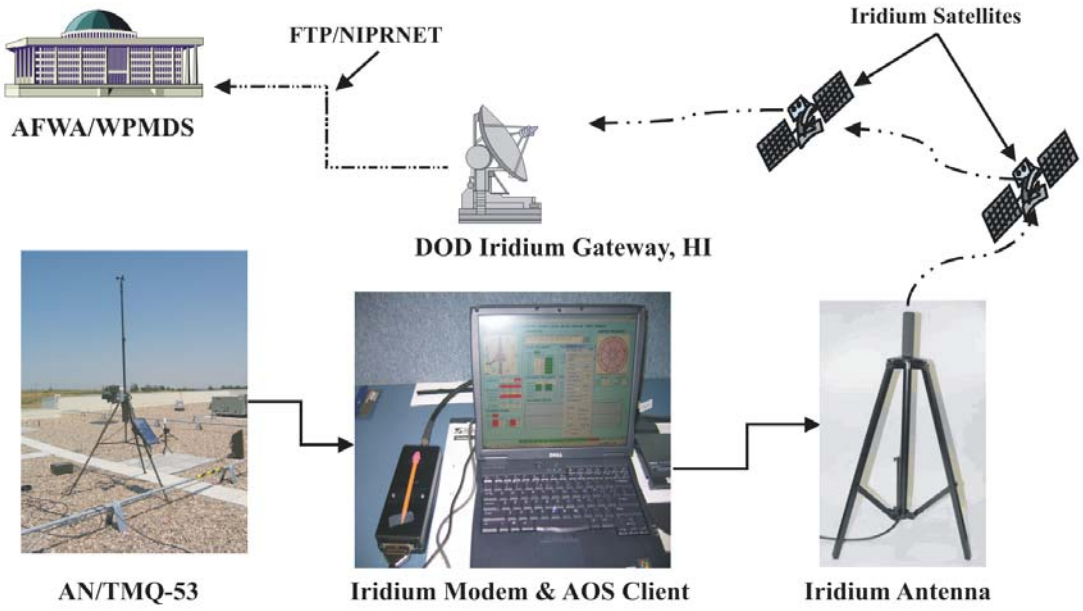


Figure 1. System Architecture

2. PRELIMINARY ACTIVATION REQUIREMENTS

2.1. Contact AFWA. Unit should have previously contacted AFWA OPS (DSN 271-2586, Commercial 402-294-2586) to obtain user name and password for WPMDS access. Unit will need to provide KQ identifier and DoD Gateway IP address to AFWA OPS.

2.2. Contact MAJCOM MSS Manager. Unit must contact Major Commands (MAJCOM) Mobile Satellite Services (MSS) manager to activate Subscriber Information Module (SIM) Card.

2.2.1. Contact MAJCOM MSS at the following world wide web address https://private.afca.af.mil/mss/MAJCOM POCs.htm

2.2.2. The Subscriber Information Module (SIM) Card serial number (located on a label affixed to the bottom of the Iridium® Modem) will be required for activation.

2.3. Setup AN/TMQ-53. Unit must assemble AN/TMQ-53 TMOS system in accordance with (IAW) TO 31M1-2TMQ53-1 prior to activating Iridium® capability.

3. HOW WORK IS ACCOMPLISHED

NOTE

If required, assistance to accomplish the following procedures is available via the Raytheon Tactical Weather Help Desk, DSN: 623-2663 or toll free at 1-(877) 856-3650, or AFWA Help Desk, DSN 271-3244 or toll free at 1-(800) 250-1750.

a. Subscriber Information Module (SIM) Card Verification

The SIM Card is shipped pre-installed in the Iridium® Modem. The SIM Card is required to connect the Iridium® Modem to the Iridium® communication satellite constellation. Perform the following steps to verify the presence of the SIM Card installed in the Iridium® Modem.

(1) Locate the SIM Card serial number affixed to the bottom of the Iridium® Modem and record for future use.

(2) Remove and retain, two Phillips head screws securing the SIM Card access panel cover to the Iridium® Modem (see Figure 2).

(3) Remove and retain, the SIM Card access panel cover.

Figure 2. Iridium® Modem with Access Panel Cover Removed

(4) Verify SIM Card presence in the SIM Card bracket located inside the SIM Card access cavity (see Figure 3).

Figure 3. SIM Card Installed

NOTE

In the event the SIM Card must be removed or installed, refer to the Installation and Removal of the SIM Card paragraph of the TROUBLESHOOTING section of this document.

(5) Reinstall SIM Card access panel cover and secure using the two Phillips head screws (see Figure 2).

b. **Antenna Setup**

(1) Route one end of 50 foot antenna cable through bottom of center pole of the Iridium® Tripod.

(2) Remove protective red cap from antenna connector and retain for future use in packing antenna into transit cases. Attach cable end to the Iridium® Antenna.

(3) Install Iridium® Antenna (see Figure 4) onto Iridium® Tripod using the three Phillips flathead screws provided (see Figure 5).

(4) Fully extend Iridium® Tripod legs and secure in place by tighting thumb screw finger tight (see Figure 5).

Figure 4. Iridium® Antenna

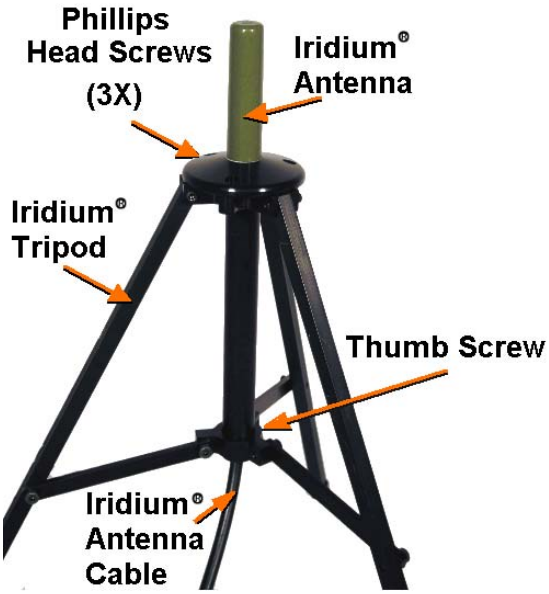


Figure 5. Iridium® Tripod with Antenna

(5) Place Antenna/Tripod Assembly in selected position.

- Usually the tactical situation determines the position of the antenna.
- The ideal setting would be a clear, flat area that affords the greatest view of the horizon in all directions and an unobstructed view of the sky (i.e., no trees, buildings, fences, power lines or mountains).
- Choose the clearest, flattest area possible.
- Often an antenna must be constructed on an irregular site. This does not mean the antenna will not work; but it does mean the site will affect the antenna's radiation pattern and function.

(6) Run the opposite end of the 50 foot antenna cable and connect to the Iridium® Modem as shown in Figure 6.

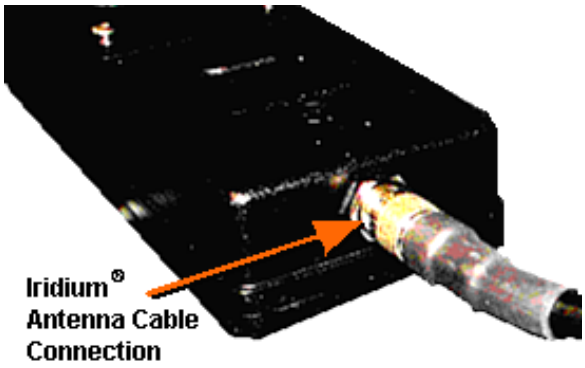


Figure 6. Iridium® Modem Antenna Connection

c. **Connect Gateway Laptop Computer**

(1) Connect power cord into power adapter and plug cord into power outlet. Insert adapter cord into power connection on back of Gateway laptop computer.

NOTE

The Gateway laptop computer has two external USB connections on the left side of the case, COM 4 and COM 5 (see Figure 7).

(2) Connect the 9 pin serial RS232 connector from TMOS sensors to USB-to-Serial converter cable.

(3) Plug the USB connection end of the USB-to-Serial converter cable into the COM 4 port on the Gateway laptop computer (see Figure 7).

(4) Connect the USB connector from the Iridium® Modem Power Adaptor and USB Interface into the COM 5 port of the Gateway laptop computer (see Figure 7).

(5) Connect the DB25 connector from the Iridium® Modem Power Adaptor and USB Interface to the Iridium® Modem as shown in Figure 8. Tighten thumbscrews to secure the DB25 connector to Iridium® Modem.

(6) Flip the wall socket (AC) prongs on Iridium® Modem power supply 90 degrees and plug the power supply into a suitable power source (see Figure 8).

Figure 7. Left Side of Gateway Laptop Computer

Figure 8. Iridium® Modem with Power Supply, DB25 and USB Connector

d. **Gateway Laptop Computer Power ON**

To connect the Iridium® Modem to the Iridium® Satellite Constellation, perform the following:

(1) Momentarily depress the laptop computer power ON button. The laptop computer will boot up and go to the Welcome to Windows screen.

NOTE

All references to the user names and passwords identified in this document are case sensitive.

(2) Press CTRL-ALT-DEL key combination to initiate the user logon sequence.

(3) Complete the USER login sequence by entering the user name and password contained in the sealed envelope provided with the AN/TMQ-53 System Baseline with Iridium® Hardware TCTO kit. If this is the first login attempt for this computer/user, you will be promted to reset the password.

NOTE

The new password must contain at least 8 characters and must use at least one character from each of the following types: uppercase alpha characters, lowercase alpha characters, numbers and special characters. All passwords are required to be reset every 90 days.

Secure the user name and administrator password contained in the sealed envelope provided with the TCTO kit for security purposes and future access requirements. If lost, the computer must be restored using the system restoration DVD. Contact the Raytheon Tactical Weather Help Desk for restoration user name and password requirements.

(4) Click the Enter command button.

e. **Launch AOS Application**

(1) Double click on the AOS Application icon from the Windows 2000 desktop display to launch the AOS application (see Figure 9).

Figure 9. AOS Application Desktop Icon

f. **AOS Standalone Configuration**

The Gateway laptop computer is pre-loaded with the AOS software application. All required configuration settings with exception of those that are site-specific have been established. The purpose of this paragraph is to allow the user to verify all settings are current and to enter any site-specific information as required.

The AOS Standalone Configuration should have been accomplished during the TCTO installation process. If the event this process has not yet been accomplished, complete the AOS Standalone configuration (see Figure 11) as directed by the following steps. If this process has previously been accomplished proceed to AutoObs Setup paragraph in this document.

(1) Select Preferences from the top menu bar (see Figure 10).

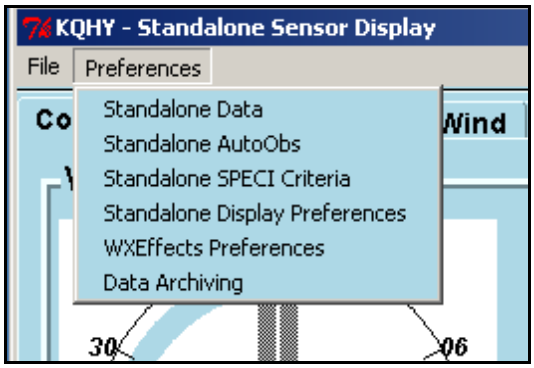


Figure 10. Preferences Menu Selection

(2) Select Standalone Data from the Preferences drop down menu selections. The Standalone Data screen is displayed (see Figure 11).

(3) Select the Active radio button in the Standalone Status group.

(4) Select the SERIAL radio button in the Standalone Sensor Source group.

(5) Select the Disabled radio button in the Standalone One Minute Archive group.

(6) Configure the AOS Standalone Data group.

(a) Enter the assigned ICAO identifier in the ICAO field.

(b) Select the CONUS or OCONUS radio button as appropriate

(c) Fill in the remaining AOS Standalone Data group fields with appropriate Site-Specific data.

(7) Configure Serial Port Data group.

(a) Port Name as COM 4.

(b) Select the 4800 Baud Rate radio button.

(c) Select the 1 Number of Stop Bits radio button.

(d) Select the 8 Bits per Character radio button.

(e) Select the None Parity radio button.

(8) Select desired graph display period from the Hours drop down list in the Graph Display Period group (default is 3).

(9) Enter NONE in the IP Address Field of the Data From group.

(10) Select the OK command button.

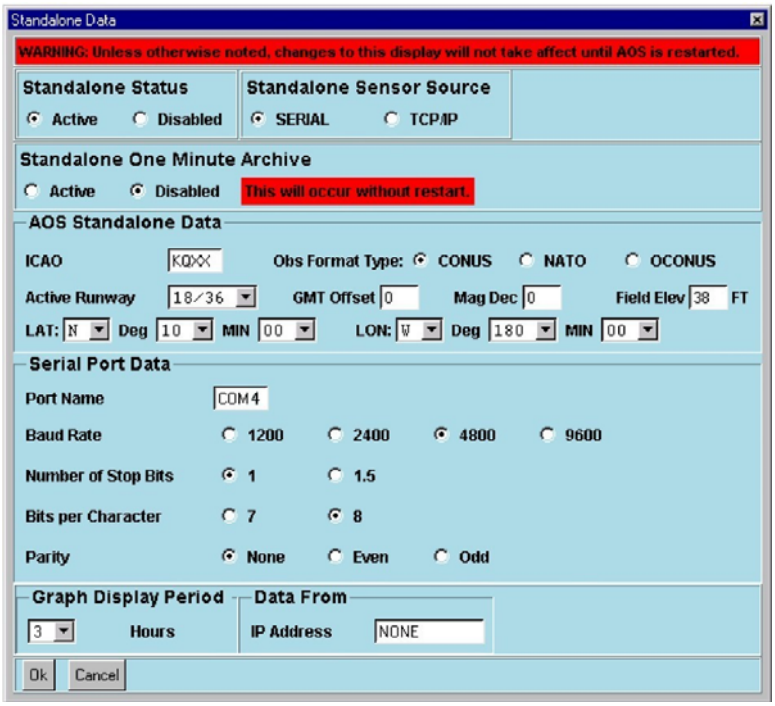


Figure 11. Standalone Data Screen

g. **AutoObs Setup**

The Gateway laptop computer is pre-loaded with the AOS software application. All required configuration settings with exception of those that are site-specific have been established. The purpose of this paragraph is to allow the user to verify all settings are current and to enter any site-specific information as required.

The Standalone AutoObs configuration page (see Figure 12) is used to configure observation modes and transmission destinations. Verify the settings for each of the sections as follows:

(1) Select Preferences from the Standalone Sensor Display menu (see Figure 10).

(2) Select Standalone AutoObs from the Preference menu. The Standalone AutoObs screen is displayed (see Figure 12).

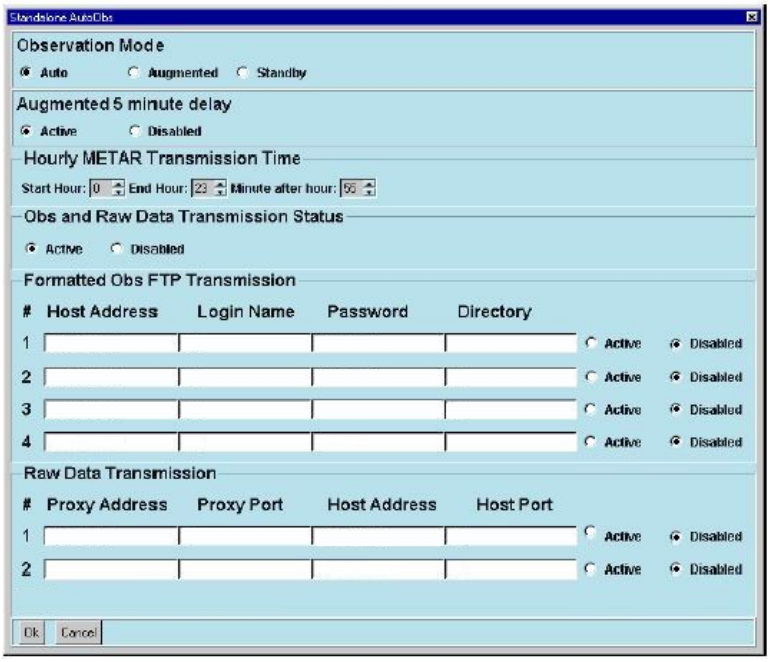


Figure 12. Standalone AutoObs Screen

(3) Select the desired Observation Mode radio button.

(a) Auto (default selection for normal operation)

(b) Augmented

(c) Standby

(4) Select the Active radio button in the Augmented 5 minute delay data group.

(5) Enter the Hourly METAR Transmsson Time settings.

(a) Ensure Start Hour is set to 0

(b) Ensure End Hour is set to 23

(c) Ensure Minute after hour is set to 55

(6) Select the Active radio button in the Obs and Raw Data Transmission Status data group.

(7) Formatted Obs FTP Transmissions settings.

(a) Ensure the Disable radio buttons for each of the fields contained in this data group are selected. The remainer of fields in this group of settings are not applicable for Iridium® configuration.

(8) RAW Data Transmission settings.

(a) Ensure the Disable radio buttons for each of the fields contained in this data group are selected. The remainer of fields in this group of settings are not applicable for Iridium® configuration.

(9) Select Ok command button.

h. **Configure AOS Standalone SPECI Criteria**

The Gateway laptop computer is pre-loaded with the AOS software application. All required configuration settings with exception of those that are site-specific have been established. The purpose of this paragraph is to allow the user to verify all settings are current and to enter any site-specific information as required. The Standalone SPECI Criteria page (see Figure 13) is used to configure ceiling and visibility threshold values for which SPECI observations will be generated. Verify the settings for each of the sections as follows:

(1) Select Preferences from the top menu bar (see Figure 10).

(2) Select Standalone SPECI Criteria from the Preferences drop down menu selections. The Standalone SPECI Criteria screen is displayed (see Figure 13).

(3) Verify the Active radio buttons in the Ceiling Criteria – In hundreds of feet data group are all set to Active.

(4) Verify the Active radio buttons in the Visibility Criteria data group are all set to Active.

(5) Enter any Unique Ceiling and Visibility criteria setting as required.

(6) Select 5 Min for the Set Test SPECI data field or as directed locally.

(7) Select Ok command button to exit this screen.

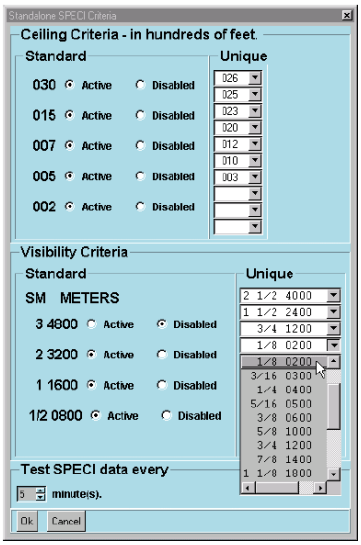


Figure 13. Standalone SPECI Criteria Screen

i. Launch Dial Up Signal Monitor (DUSM) Application

(1) Double click on the Dial Up Signal Monitor (DUSM) application icon from the Windows 2000 desktop display (see Figure 14).

Figure 14. Dial Up Signal Monitor Application Desktop Icon

j. Configure Dial Up Signal Monitor Software

The Gateway laptop computer is pre-loaded with the NAL Dial Up Signal Monitor software application. All required configuration settings with exception of those that are site-specific have been pre-loaded. The purpose of this paragraph is to allow the user to verify all settings are current and to enter any site-specific information as required.

The DUSM software configuration screens are used to configure observation modes and transmission destinations. Verify the data setting and configurations as follows:

(1) Setting the COM Port.

(a) Select Properties from the Options menu (see Figure 15).

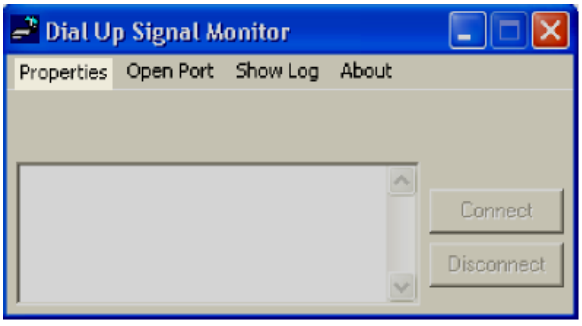


Figure 15. Dial Up Signal Monitor – Properties

(b) Select COM Port (see Figure 16).

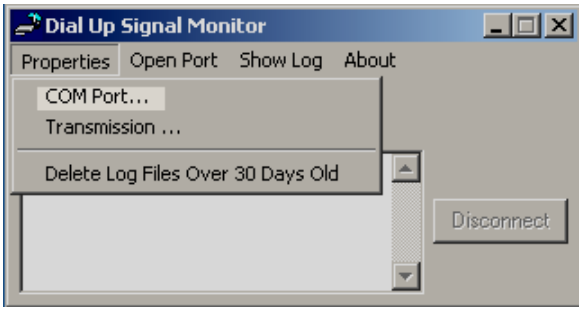


Figure 16. Properties – COM Port Screen

(c) Select from the COM Port drop down menu COM5 (see Figure 17).

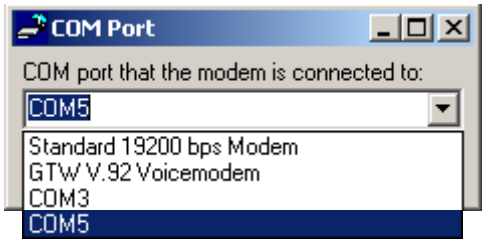


Figure 17. COM Port – COM5

(d) Select the Set command button (see Figure 18).

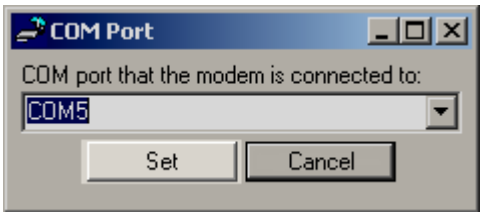


Figure 18. COM Port – COM5 - Set

(2) Setting Up Transmission Information.

(a) Select Properties from the Options menu.

(b) Select Transmission (see Figure 19).

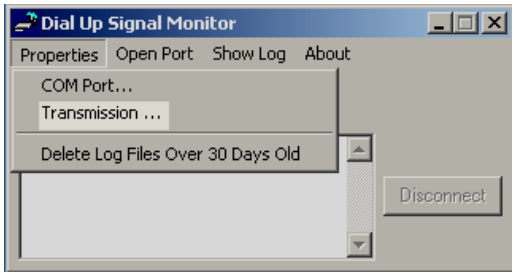


Figure 19. Dial Up Signal Monitor – Properties /Transmission

(c) Enter information in the Transmission Information screen (see Figure 20).

1) Host Address field – Enter 131.7.251.34 on line 1 for AFWA/WPMD server.

2) Login Name – Enter the Login User name provided by AFWA OPS.

3) Password – Enter the Login Password provided by AFWA OPS.

4) Directory – Leave this field blank.

5) Active or Disable radio button – Set the Active radio button on line 1.

(d) Verify the Directory with metarFD files location is set to "C:\Program Files\AOS\tbls\".

(e) Enter 5 in the Max Minutes for Transfer field.

(f) Select the Enabled radio button in the Transmit Files by FTP data group.

(g) Select the Save command button to save the Transmission Information screen settings.

(h) Select the Close command button to exit the Transmission Information screen.

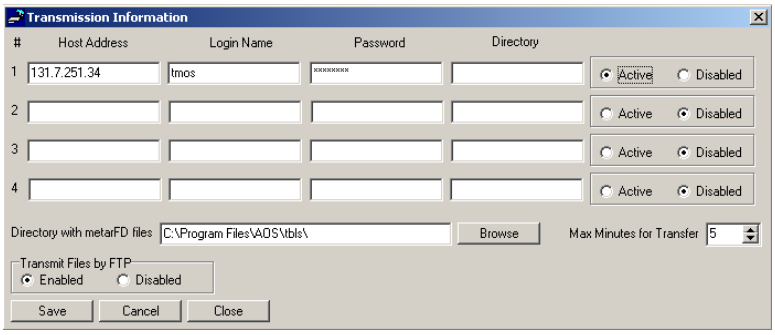


Figure 20. Transmission Information Screen

(3) Opening the COM Port.

(a) Select Open Port from the Options menu (see Figure 21).

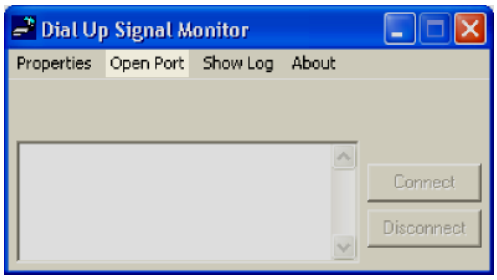


Figure 21. Dial Up Signal Monitor – Open Port Configuration

k. Transmitting Weather Data via Iridium® Modem

The following steps describe the procedure to transmit weather data via the Iridium® Modem

(1) Ensure AOS and DUSM applicatons have been launched and are operating (if required, refer to section 3 paragraph e(1) and section 3 paragraph i(1) of this document for launch instructions)

(2) Open DUSM COM Port.

(a) Verify the DUSM COM Port has been opened. DUSM will be in Monitor Mode if COM Port is open (see Figure 22).

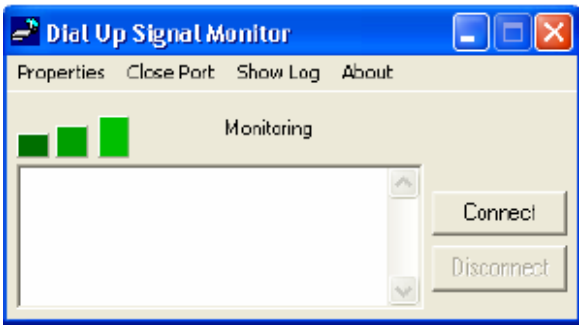


Figure 22. Dial Up Signal Monitor – Monitor Mode

1) If the COM Port is not OPEN select Open Port from the Options menu (see Figure 23).

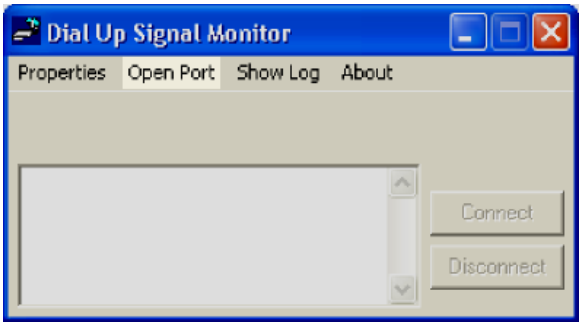


Figure 23. Dial Up Signal Monitor – Open Port Selection Hi-lighted

(3) Verify minimum signal strength of the Iridium® Modem.

(a) Minimum signal strength should be three bars (see Figure 24).

1) If less than three bars are registering on the DUSM display, reposition the Iridium® Antenna for greatest signal strength capture.

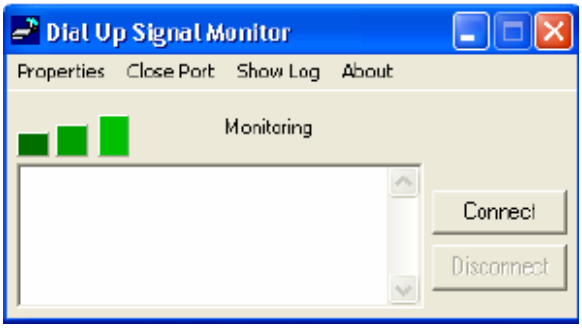


Figure 24. Dial Up Signal Monitor – Three Bars Signal Strength Displayed

NOTE

Three bars is considered the minimum standard acceptable level for reliable Iridium® communication of data. The system may operate with less than three bars, although the reliability of the Iridium® communication is considerably less.

(4) Generate Manual Weather Observation.

(a) Select Edit Obs command button on the AOS Standalone Sensor Display (see Figure 25). The Augmented Observation Edit Window will be displayed (see Figure 26).

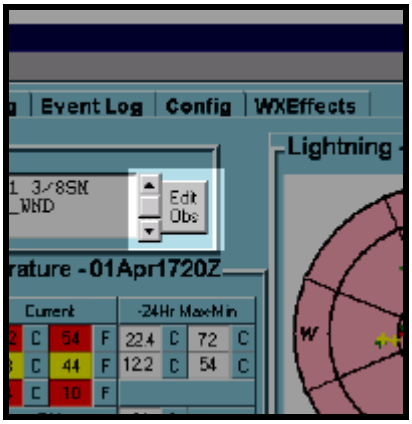


Figure 25. Edit Obs Command Button

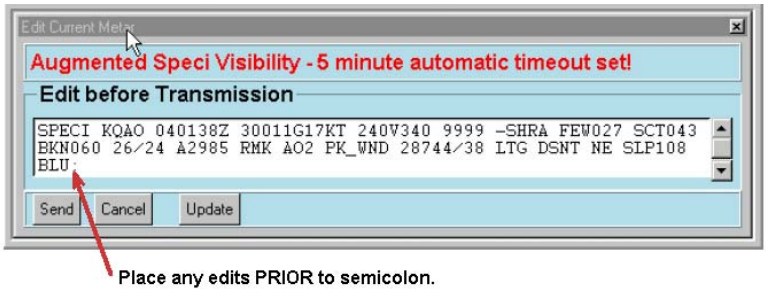


Figure 26. Augmented Observation Edit Window (5 minute delay set)

(b) Edit Observation as desired.

(c) Select Send command button to transmit observation.

l. **Verifying Iridium® Transmission**

(1) Select Show Log from the DUSM Options Menu (see Figure 27).

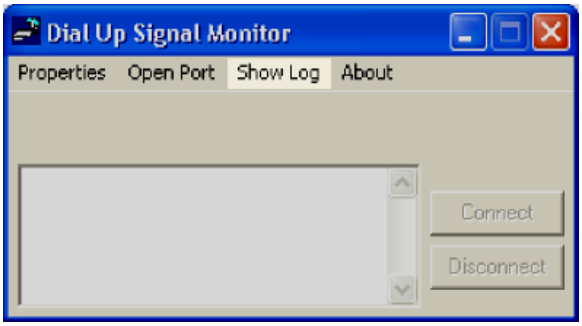


Figure 27. Dial Up Signal Monitor – Show Log

(2) Verify DUSM has detected and sent the edited observation (see Figure 28).

NOTE

Do not use the AOS Observation Log for verification of obs sent. OBSERVATION NOT SENT is normal for AOS Obs Log. Use the DUSM Observation Log for transmission verification.

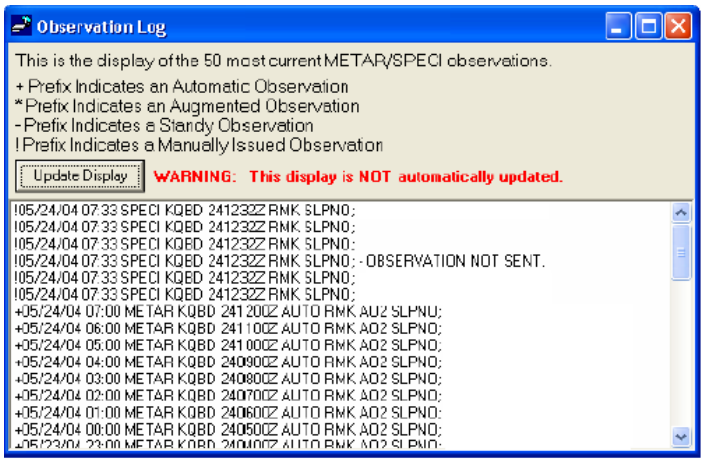


Figure 28. Dial Up Signal Monitor – Observation Log

(3) Verify receipt of observation through JAAWIN or by contacting the Raytheon Tactical Weather Help Desk (DSN 623-2663, or toll free 1 (877) 856-3650).

4. TROUBLESHOOTING

The following are a few situations that may arise when performing system setup and configuration. For additional troubleshooting procedures contact the RTSC help desk (DSN 623-2663, or toll free 1 (877) 856-3650).

a. Error Message

(1) "Open Error on port 1: couldn't open "COM4": no such file or directory AOS is in safe mode. No data retrieval or communications will occur. You are allowed to edit the standalone data configuration and try again." (see Figure 29 and Figure 30).

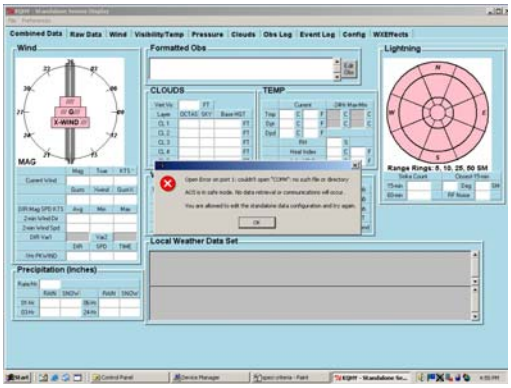


Figure 29. AOS Display with Open Error Failure Message

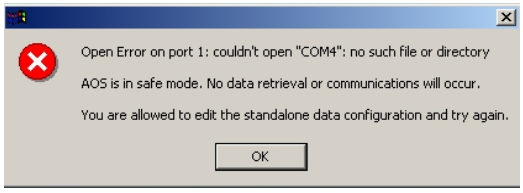


Figure 30. Open Error Failure Message

(a) Ensure that the sensor connection is connected to the COM4 USB port as directed in section 3, step c(3) of this document.

(b) Ensure that the AOS Software Standalone Configuration has the Port Name identified as COM4 as directed in section 3, step e of this document.

b. **Installation and Removal of the SIM Card**
The following steps describe the installation of the SIM Card. To remove, perform the steps in section b in reverse order.

(1) Remove two Phillips head screws from the access cover of the Iridium® Modem (see Figure 31).

(2) Remove the access cover from the Iridium® Modem (see Figure 31).

Figure 31. Iridium® Modem with Cover Removed

CAUTION

The SIM Card will fit into the SIM Card bracket and socket assembly without undue pressure. Do not force the SIM Card into the SIM Card bracket. Ensure the notch on the SIM Card is positioned correctly prior to closing the SIM Card bracket into its normal operating position (see Figure 34). Excessive pressure can damage the SIM Card and the Iridium® Modem.

(3) Slide the SIM Card locking mechanism to the OPEN position (see Figure 32). Figure 33 illustrates the SIM Card bracket in the open, tilted up and ready to accept SIM Card, position.

(4) Place the SIM Card into the SIM Card bracket (see Figure 34).

(5) Carefully lower the bracket and return the locking mechanism to the closed positon by sliding the locking mechanism in the opposite direction of the OPEN arrow (see Figure 32 and Figure 35).

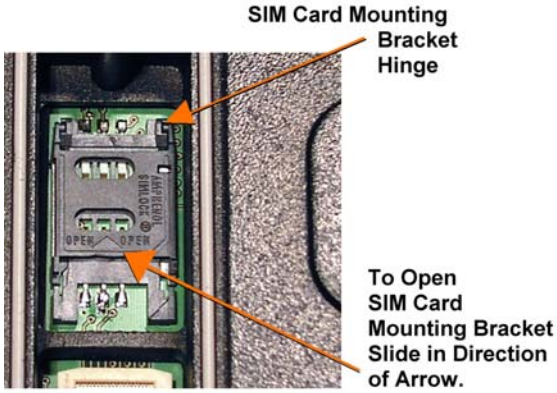


Figure 32. Iridium® Modem SIM Card Locking Mechanism

Figure 33. SIM Card Bracket in Open Position

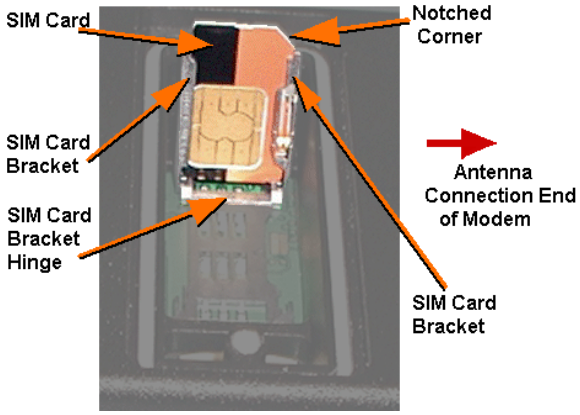


Figure 34. SIM Card In Bracket

Figure 35. SIM Card Locked Place

(6) Reinstall the SIM Card access cover (see Figure 31).

(7) Replace two Phillips head screws into the access cover and secure cover to modem.

c. **Re-initalization of the Gateway Laptop Computer**

Should the Gateway laptop computer need to be re-initialized, perform the following steps.

(1) Close the DUSM COM Port by selecting CLOSE PORT on the DUSM Options Menu (see Figure 22).

(2) Close all open software applications.

NOTE

To avoid a possible computer lockup, all applications should be closed normally prior to shutting down the computer with the power switch. In the event of a computer lockup, press and hold the computer power switch until the computer turns off.

(3) Select the Start command button at the bottom of the Windows 2000 desktop.

(4) Select Shut Down from the popup menu.

(5) Select the desired mode of Shut Down from the “What do you want the computer to do?” drop down menu.

(6) Select the OK command button.

(7) Restart Windows 2000 according to the direction provided in section 3, paragraph d of this document.

d. Re-initalization of the Iridium® Modem

Should the Iridium® Modem need to be re-initialized, perform the following steps.

(1) Close the DUSM COM Port by selecting CLOSE PORT on the DUSM Options Menu (see Figure 22).

(2) Disconnect the Iridium® Modem power supply from the power outlet.

(3) Wait approximately 10 seconds.

(4) Reconnect the Iridium® Modem power supply to the power outlet.

(5) Open the DUSM COM Port by selecting the OPEN PORT on the DUSM Options Menu (see Figure 23).

e. Disconnect Command Button of DUSM Application

In the event of communication lock up between the TMOS system and the Iridium® Satellite constellation, the user may manually interrupt the link by depressing the Disconnect command button of the DUSM software application. This should only be required if the automatic redial function of the software does not activate.

f. Removing Iridium® SIM Card PIN input for Iridium® Modem

(1) If Dialup Signal Strength Monitor (DUSM) is running, click on “Close Port”. If it is not running, continue with step (2).

(2) Open HyperTerminal by clicking on “Start” button, “Programs”, “Accessories”, “Communications”, “HyperTerminal”.

(3) Enter “Iridium” in the “Name” block, click “Ok”.

(4) Under the “Connect using” drop-down menu, select “Com 5”, click “OK”.

(5) When the “Port Settings” menu pops up, leave all settings at their defaults and click “OK”

(6) Type ATI03, then press “Enter”. If you see SAC0307, then you are now talking to the modem.

(7) Type AT+CPIN=”1111”, press the Enter key.

(8) This will take a few seconds, if you see “OK” pop up on the screen, then it worked, if not then repeat all the steps. This will unlock the SIM card to allow modem usage.

(9) Type AT+CLCK=”SC”,0,”1111”, press the Enter key.

(10) This will take a few seconds, if you see “OK” pop up in HyperTerminal, then this will disable the PIN request and you should never have to re-enter the PIN again even if you power off the modem.

(11) Now, you may close HyperTerminal. A message will pop up asking if you want to disconnect, click "YES". Another message will pop up asking if you want to save the Iridium session, click "YES"

(12) After HyperTerminal is shut down, you may click on the "Open Port" button on the DUSM. If everything else has been set-up properly, you should see signal strength pop up in the DUSM window.

g. **Restoration of Gateway Laptop Computer**

Should the Gateway Laptop computer need to be restored to its original out-of-the-box configuration, perform system restoration as described in the following steps.

NOTE

The restoration process will reset all user configuration and setup settings to their default state.

System restoration will take approximately 15 minutes.

(1) Locate restoration disk from transit case QTR103.

(2) If not already powered up, Press the Power On button to power up the Gateway laptop computer to enable the user to open the DVD-ROM Drive door.

(3) Place the restoration disk into the DVD-ROM drive of the Gateway laptop computer.

(4) Press the Power Off button to power down the Gateway laptop computer.

(5) Press the laptop computer Power On button to boot the computer.

(6) **Immediately** press the "F-10" key to enter the Boot Sequence Menu.

(7) Enter 2 (Boot from CD/DVD).

(8) The GATEWAY LAPTOP RESTORATION WARNING screen is displayed (see Figure 36).

(a) To abort the restoration process enter the letter "N". The ABORTING RESTORE screen is displayed (see Figure 37).

1) Remove the Restoration DVD from the DVD Drive and press the Power Off button to power down the computer.

(b) To continue with the restoration process enter the letter "Y". The RESTORE CONFIRMATION statement is added to the RESTORATION PROCEDURES WARNING screen (see Figure 38).

(c) To abort the restoration process enter the letter "N". The ABORTING RESTORE screen is displayed (see Figure 37).

(d) To confirm the restoration process enter the letter “Y”. The DISK RESTORATION PROGRESS screen is displayed. At completion of the Gateway restoration process, the RESTORATION COMPLETED screen is displayed (see Figure 39).

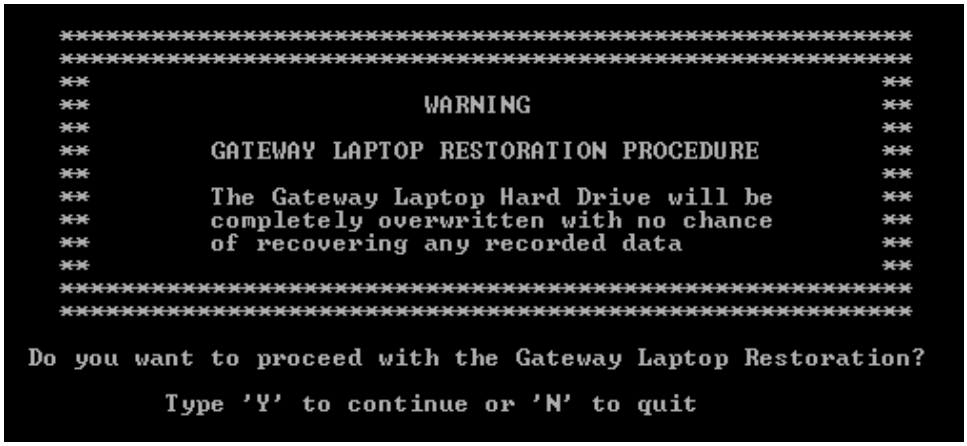


Figure 36. Restoration Procedure Warning Screen

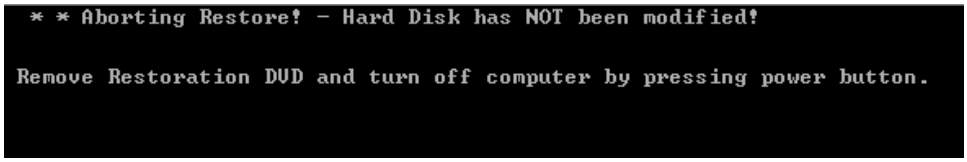


Figure 37. Aborting Restore Screen

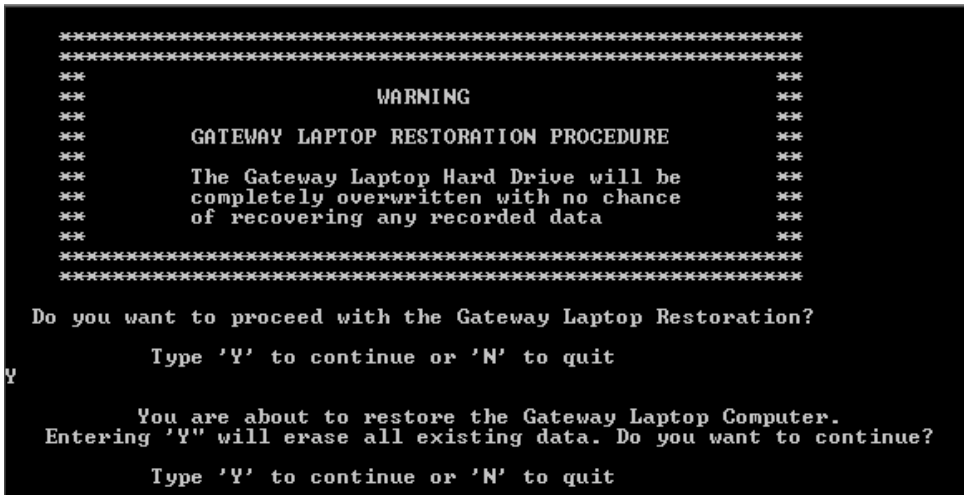


Figure 38. Restoration Confirmation Statement

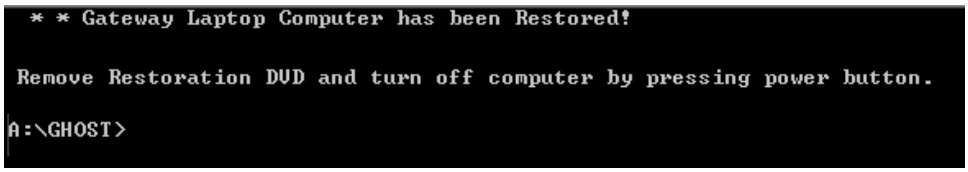


Figure 39. Restoration Completed Screen

(9) Remove the system restoration disk.

(10) Press the Power Off button to power down the computer system.

(11) Press the Power On button to boot the computer system. After initialization, the WELCOME TO WINDOWS screen is displayed.

(12) Press CTRL-ALT-DEL to begin the logon sequence. The LOGON TO WINDOWS screen is displayed.

NOTE

All references to the user names and passwords identified in this document, are case sensitive.

(13) Complete the user logon sequence by entering the administrator user name and password provided with the originial Iridium® TCTO kit. You will be prompted to change the password.

NOTE

The new password must contain at least 8 characters and must use at least one character from each of the following types: uppercase alpha characters, lowercase alpha characters, numbers and special characters. All passwords are required to be reset every 90 days.

Contact Raytheon Tactical Weather Helpdesk if user name and password are not available (see paragraph 3. for contact information).

(14) Click the Enter command button.

(15) Double click the Time display (located in the lower right corner of the screen). The Time/Date Properties screen is displayed.

(16) Verify the Time and Date settings are set to the current Greenwich Mean Time (GMT) and current date. If required adjust the time and date setting to the current GMT time and date.

(17) Verify the Time Zone is set to GMT. If required select the Time Zone tab and select the time zone labeled “Greenwich Mean Time : Dublin, Endinburgh, Lisbon, London”.

(18) Verify the “Automatically adjust clock for daylight saving changes” checkbox is not checked.

(19) Log off “administrator” account and log on “user” account using originial user name and password provided in TCTO kit. You will be prompted to change password.

(20) Reconfigure AOS and the Dial-up Signal Monitor Software application settings from the instructions provide in the following paragraphs of this document.

(a) AOS Standalone Configuration (see page 11).

(b) AutoObs Setup (see page 13).

(c) Configure AOS Standalone SPECI Criteria (see page 15).

(d) Configure Dial Up Signal Monitor Software (see page 16).

(e) Validate weather data transmission. (see page 18 thru 20).

5. PREPARATION FOR SHIPMENT OR STORAGE

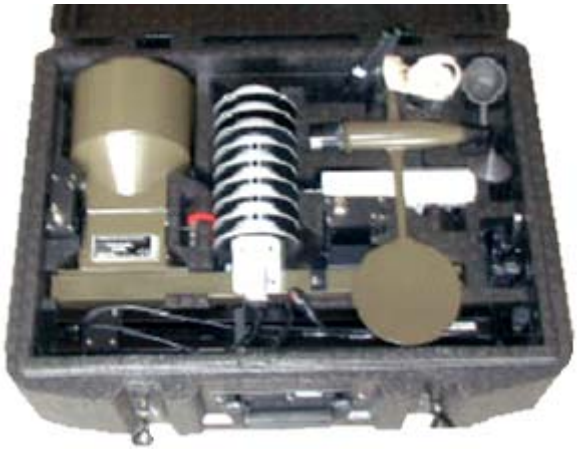
The following is a listing of the AN/TMQ-53 equipment and the transit case and location where components are to be placed for shipment and storage. Prior to storage or shipment all equipment is required to be clean and free of debris.

NOTE

Store all the sensors and devices in their transit cases. Components are not interchangeable among transit cases.

Prior to storage or shipment all equipment is required to be clean and free of debris.

5.1. Case QTR101 Contents. Figure 40 displays the contents and identifies the dimensions, weight and volume of Transit Case QTR101. Table 1 lists the contents of Transit Case QTR101.



Dimensions:
25.8 x 17.7 x 9.8 in.
Weight:
16 pounds
Volume:
2.59 cu/ft.

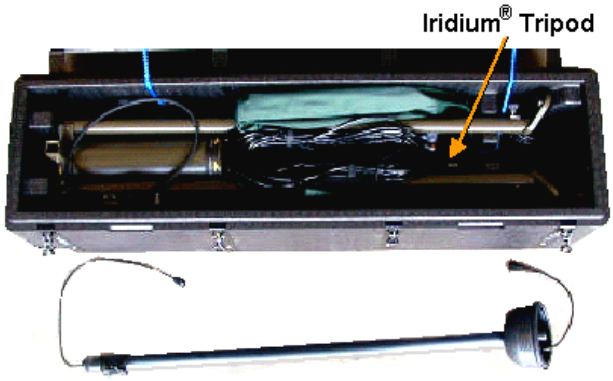
Figure 40. Case QTR101 Contents

Table 1. Transit Case QTR 101 Inventory

Item Description	Part Number	Quantity
Combined Wind Vane and Sensor	WMS302M	1
Sensor Arm with Rain Gauge	QMR101M	1
Temperature and Humidity Probe	HMP45DX	1
Hand Held Display	QMD101M	1
Radio Modem	RFM96W	2
Antennas	Varies*	2
Radio Modem Cable - MAWS Connection	ZZ45212	1
Radio Modem Cable - PC Connection	ZZ45213	2
Rubber Antennas	Varies*	2
Power Supply for Interior Modem	QPS211	1
Compass	MC-2G	1
Serial Cable for PC-Cable Modem	ZZ45202	1
Extension Cord	QPS101	1

* The Transit Case QTR 101 may be equipped with either two UHF or two VHF antennas.

5.2. Case QTR102 Contents. Figure 41 displays the contents and identifies the dimensions, weight and volume of Transit Case QTR102. Table 2 lists the contents of Transit Case QTR102.



Dimensions:
52.8 x 14.6 x 13.4 in.
Weight:
62 pounds
Volume:
5.98 cu/ft.

Figure 41. Case QTR102 Contents

Table 2. Transit Case QTR 102 Inventory

Item Description	Part Number	Quantity
Tripod with the Logger and solar panel with battery	QML101T	1
Accessories	N/A	1
Telescopic Mast	QM30154	1
Ground Peg Bag with Three Ground Pegs and Foot Pads	QMY103M	1
Antenna Accessory Bag with Tripod and either VHF or UHF Adapter*		
Tripod, PC Antenna	QM30176	1
VHF Tripod Adapter	QM40263	1
UHF Tripod Adapter	QM30185	1
Serial Cables (75 foot)	ZZ45114	3
Outdoor Power Cable (110 Volts)	QPS101	1
Outdoor Power Cable (230 Volts)	QPS103	1
Iridium® Tripod (with three antenna mounting screws installed)	AYN-MNT-ANT	1
Mains Power Cable	ZZ45121-1	1

* The Transit Case QTR 102 may be equipped with either a UHF or a VHF tripod adapter.

5.3. Case QTR103 Contents. Figure 42 displays the contents and identifies the dimensions, weight and volume of Transit Case QTR103. Table 3 lists the contents of Transit Case QTR103.

Dimensions:
25.8 x 17.7 x 9.8 in
Weight:
19 pounds
Volume:
2.59 cu/ft.

Figure 42. Case QTR103 Contents

Table 3. Transit Case QTR 103 Spares and Tool Kit Inventory

Item Description	Part Number	Quantity
Hammer	25926	1
Hex Key (Allen Wrench) 3mm	G86756	1
Hex Key (Allen Wrench) 4mm	25925	1
Common Stubby Screwdriver (5.5mm x 25mm)	26271	1
QMP202 Power Supply Case Key	16139	1
Lens Wipes	CP400	1 (box)
Velcro Strap Back-ups	19558	1(set)
Handheld Display	QMD101M	1
Back-up QMP201 Battery	4017	1
Antenna Components	Varies*	1
Adapter Power Plug Kit	26222	1
Combined Wind Vane and Sensor	WMS302M	1
HAZMAT Paperwork	N/A	1
Gateway Laptop Computer	400E(VTX)	1
Iridium® Antenna	SAF5350-C	1
System Restoration Disk	N/A	1
Universal Power Converters	N/A	1(set)
Power Adapter for Laptop	N/A	1
#2, 6 Inch Phillips Screwdriver	N/A	1
Iridium® Modem	A3LA-IU	1
Subscriber Information Module (preinstalled in Iridium® Modem)	0020AH	1
Iridium® Modem Power Supply with USB Interface	LA2098U	1
USB to Serial Converter Cable	N/A	1
Technical Manual TACMET Weather Station MAWS201M Operating Instructions	TO 31M1-2TMQ53-1	1

* The Transit Case QTR 103 may be equipped with either UHF or VHF antenna components.

5.4. Case QTR104 Contents. Figure 43 displays the contents and identifies the dimensions, weight and volume of Transit Case QTR104. Table 4 lists the contents of Transit Case QTR104.

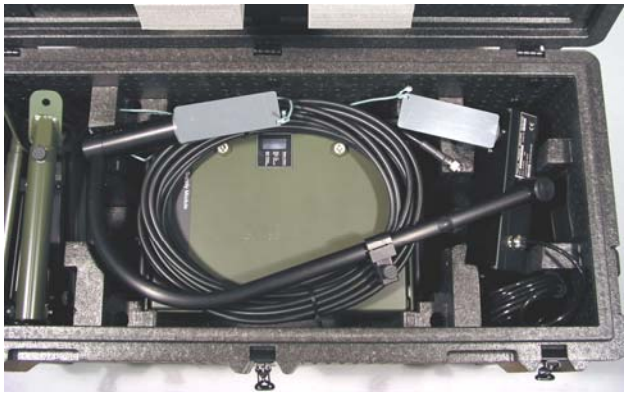
Dimensions:
38 x 18.2 x 17.6 in.
Weight:
53 pounds
Volume:
7.23 cu/ft.

Figure 43. Case QTR104 Contents

Table 4. Transit Case QTR 104 Inventory

Item Description	Part Number	Quantity
Ceilometer	CT25KAM	1
Ground Pegs for Ceilometer	QM40142	4
AC Power Cable for Ceilometer	CT45300	1
DC Power and Data Cable for Ceilometer	CT45298	1
Lightning Detector	SA20M	1
Grounding Net with Pegs for Lightning Detector	QM40287	1
Cable Lightning Detector	ZZ45215	1

5.5. Case QTR105 Contents. Figure 44 displays the contents and identifies the dimensions, weight and volume of Transit Case QTR105. Table 5 lists the contents of Transit Case QTR105.



Dimensions:
39 x 18.2 x 17.6 in.
Weight:
98 pounds
Volume:
7.23 cu/ft.

Figure 44. Case QTR105 Contents

Table 5. Transit Case QTR 105 Inventory

Item Description	Part Number	Quantity
Present Weather Detector	PWD11A	1
Tripod	SA20M	1
Power Supply	QMP202	1
Mains Power Cable	ZZ45121-1	1
Enhancement Data Cable	ZZ45123	1
Iridium® Antenna Cable (50 Foot)	LMR-400-50	1
Material Safety Data Sheets (MSDS)	N/A	1

6. Programming the AN/TMQ-53 (TMOS) RF Modems.

a. Introduction.

With the change from the Dell laptop computers to the Gateway laptop computers, users will have new procedures and software to program the RFM96W Pacific Crest RF Modems. These modems will continue to be used to transmit data from the TMOS sensors and data logger to the laptop as needed by distance, where AOS software will convert the raw data into a weather observation for transmission.

The new Gateway Laptops do not have a built-in serial port, requiring the users to connect to either the TMOS directly with the 75-ft Landline Cables (ZZ45114) or to the Radio Frequency (RF) Modem with the USB-to-Serial Converter Cable. This cable should be used with COM 4 as identified in the AN/TMQ-53 System Baseline with Iridium® Hardware TCTO on Page 7, Figure 3.

Additionally, the Pacific Crest "RFMCONFD" Program, Dealer Revision 1.71 (located on the Gateway laptop computer at C:\Program Files\AOS\paccrest\rfmconfd.exe) can only "read" the RF Modem settings and cannot reprogram it with the USB-to-Serial conversion. The user will now use Pacific Crest's "PDLCONF" Program, Dealer Revision 4.00 (located on the Gateway laptop computer at C:\Program Files\PCC\PDLCONF4.0\Dealer\PDLCONF.exe), which can be selected using the "PDL" icon on the Desktop screen. While this software was designed to be able to use the USB-to-Serial Converter Cable, there are some minor problems that have been identified to the manufacturer and will be discussed in this guide, along with the overall use of the software.

b. Preparation.

Prior to the use of any RF Modem, the user is responsible for requesting and obtaining an appropriate frequency to use with the TMOS. There are five ranges of frequencies available, each with a separate set of RF Modems and Antennas: 132-150 MHz VHF (currently unavailable), 150-174 MHz VHF, 410-430 MHz UHF, 430-450 MHz UHF, and 450-470 MHz UHF. This information, along with additional detailed transmission and modulation data available from the RTSC Tactical Weather Help Desk when requested, will need to be submitted to the local Frequency Control Manager for the operating location of the TMOS. Once approved, the Frequency Control Manager will be able to provide a primary and alternate frequency for the system to use.

(1) If the approved frequency does not match the system's current RF Modems and Antennas, contact the RTSC Tactical Weather Help Desk to request alternate components. RTSC will ship the replacement RF Modems and Antennas, and request the return of the original parts when applicable.

NOTE

This information on programming the TMOS RF Modem will supersede:

The Vaisala "TACMET Weather Station MAWS201M Operating Instructions (Jun 00)," Chapter 2, "Configuring the Radio Modem Settings" (Pages 31-32).

The Air Force Combat Weather Center "Tactical Meteorological Observing System (AN/TMQ-53) Lesson Plan," Paragraphs 4.b.4) to 4.b.5) (Pages 39-41).

Both manuals contain other relevant information on the RFM96W RF Modems.

c. Hardware Requirements.

- Gateway Laptop Computer with "PDLCONF" software.
- USB-to-Serial Converter Cable (included with the Gateway/Iridium upgrade package).
- PC/Handheld Data Cable, ZZ45202.
- Modem-to-PC Cable, ZZ45213.
- Modem/Hand Held Device (HHD) Power Supply, QMP211US.
- The RF Modem(s), RFM96W, to be programmed.

d. Setting up the Hardware.

(1) Connect the Modem-to-PC Cable, PC/Handheld Data Cable, and the USB-to-Serial Converter Cable together in series. Each cable connector can only be connected via the appropriate ends.

(2) Plug the USB connection end into COM 4 port on the Gateway laptop computer (see TCTO, Page 7, Figure 3). This can be done with the laptop running or prior to starting/booting the computer.

(3) Plug the Modem-to-PC Cable end with its Locking Ring into the matching port connection on the modem, aligning the red marks on each.

(4) DO NOT CONNECT the Modem/HHD Power Supply to the dongle cable on the Modem-to-PC Cable at this time.

e. Using the PDLCONF v4.00 Software.

(1) Select the "PDL" icon on the Gateway Desktop by double-clicking it. This will open the modem configuration program.

(2) In the upper-left corner of the "PdlConf – Dealer" window is a small, blue "PDL" icon (see Figure 45). Click it once to bring up the software's submenu and click on "Select Serial Port." (see The software should recognize that the COM 4 USB Port is active with the connected RF Modem and it will be the correct selection. This will only be displayed if the USB-to-Serial Cable is plugged in. The Iridium modem, if in use at the time of programming the RF Modem, or if its USB connector is in place, will show as having "Serial Port (COM) 5 Available" and it should not be used for this procedure. Select or highlight "Serial Port 4, Available" (see Figure 47) and click the "OK" button to select this port.

Figure 45. PDL Icon

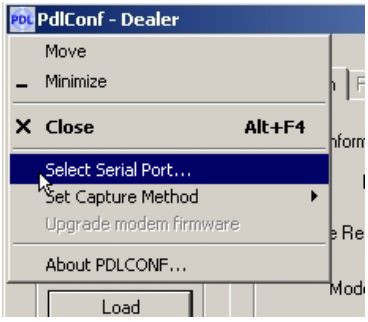


Figure 46. Select Serial Port Selection

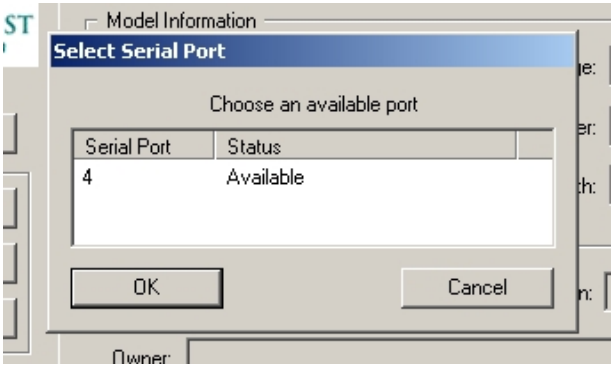


Figure 47. COM Port 4 Available

(3) Click the blue "PDL" icon in the upper-left corner again and highlight "Set Capture Method." Ensure the "Power On Capture" method has a checkmark next to it. If not, select it by clicking it once.

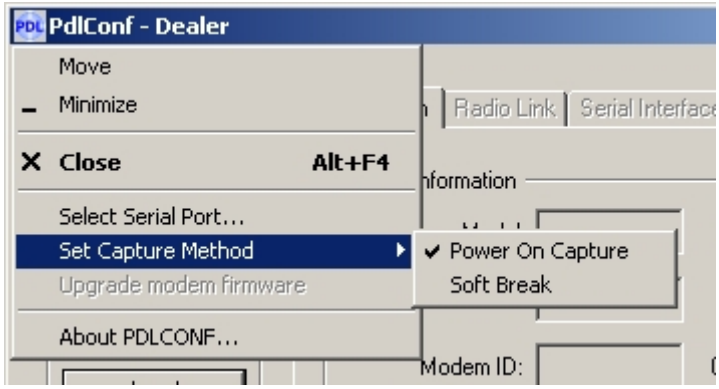


Figure 48. Set Capture Method – Power On Capture Checked

(4) Prepare to connect the Modem/HHD Power Supply connector to the PC/Handheld Data Cable dongle, located on the side of its 9-pin serial connector. Click on the PDLCONF "Load" button. A window will open indicating the user has 10 seconds to "power cycle" the RF Modem by connecting (or disconnecting and reconnecting) the Modem/HHD Power Supply to the dongle. Once the power is connected, in most cases the RF Modem "TX/STAT" light will come on and stay on.

NOTE

The power cycling of the RF Modem **will usually fail the first time**, indicated by a "Modem Capture Failed" message (see Figure 49). If this occurs, close the PDL program and restart it. With the RF Modem "TX/STAT" light on, reselect the "Load" button on the window and software should successfully connect to the modem.

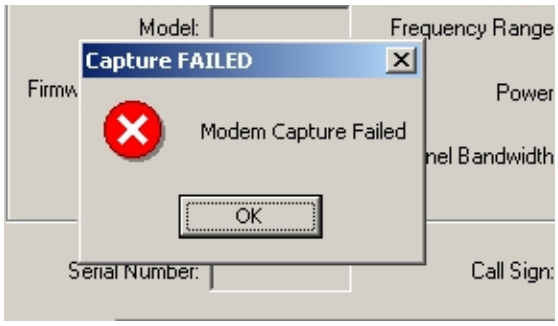


Figure 49. Modem Capture Failed Message

f. 132-150 VHF RF Modems "Mapping Error"

- Currently the PDL Software will not work with the 132-150 VHF RF Modems and will generate a "Mapping Error." This situation has been identified to Pacific Crest Corporation for resolution. Until further notice, the previously used "RFMCONFD" Software (v1.71) on the Dell Laptops will need to be used to reprogram the low range VHF RF Modems until this can be resolved. While this software is loaded on the Gateway Laptop, it can only "read" all of the RF Modems and cannot reprogram any of them.

g. Programming the RF Modem.

(1) Identification Tab.

The Identification Tab (see Figure 50) will show the user the RF Modem Model, Frequency Range, Firmware Revision, Modem ID, Channel Bandwidth, and Serial Number. The user has the option of entering a Call Sign (e.g., ICAO, KQ Identifier, etc.) or Owner information (e.g., Unit, TMOS System Number, etc.) if desired in the appropriate boxes. These can be left blank.

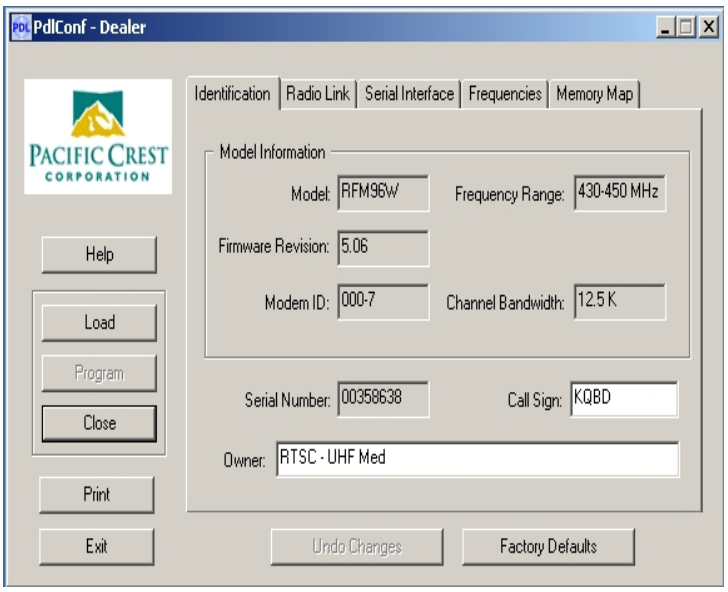


Figure 50. Identification Tab

NOTE

Normally, the "Factory Defaults" button will not need to be used for any of the tabs.

(2) Frequencies Tab.

The Frequencies Tab (is arranged by Channel Number (0-15) and separated into Transmission (TX) and Reception (RX) Frequency columns.

(a) Click on the appropriate Channel Number-TX Frequency (MHz) box and enter the frequency to be used to the ten- thousandths (e.g., 410.1250, 160.5000, etc.). The Channel Bandwidth for the RF Modems is 12.5 Kilohertz (.0125 MHz), which the local Frequency Control Manager should account for in selecting the frequency to be used with the TMOS.

(b) Perform the same operation for the matching "Channel Number-RX Frequency" box. Remember the Channel to be used, as it will need to be entered to program the TMOS using the Handheld Display (HHD Menu Page 8, "Setup," "Rf-HT" (Tripod RF Modem Channel Number) and Rf-PC (PC RF Modem Channel Number). Complete all the Channel Frequency entries needed.

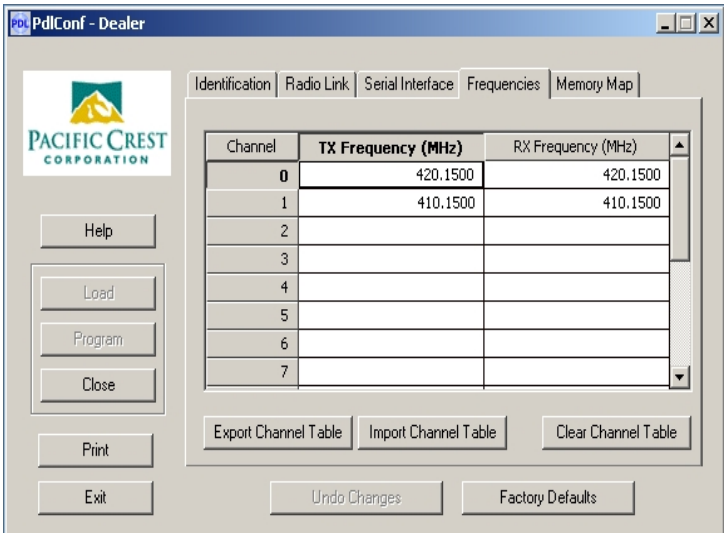


Figure 51. Frequencies Tab

(3) Radio Link Tab.

The Radio Link Tab (see Figure 52) displays Channel choices and their matching frequencies.

(a) Select the down arrow to view all those previously entered at the "Frequencies" tab and highlight the one to be used. Typically, most TMOS users have their primary frequency set into "Channel 00" ("0" on the Handheld Display) and the alternate frequency (if used) in "Channel 01" ("1" on the Handheld Display). Table 6 identifies the remaining settings for the Radio Link Tab.

Table 6. Radio Link Tab Parameter Values

Parameter	Value
Link Rate:	4800 (Baud)
Digisquelch:	Moderate
Scrambling:	On (checked)
Transmit Retries:	3
TX ACK Timeout:	0.1
Forward Error Correction:	On (checked)
CSMA Monitor:	On (checked)
Remote Address:	255
Local Address:	0

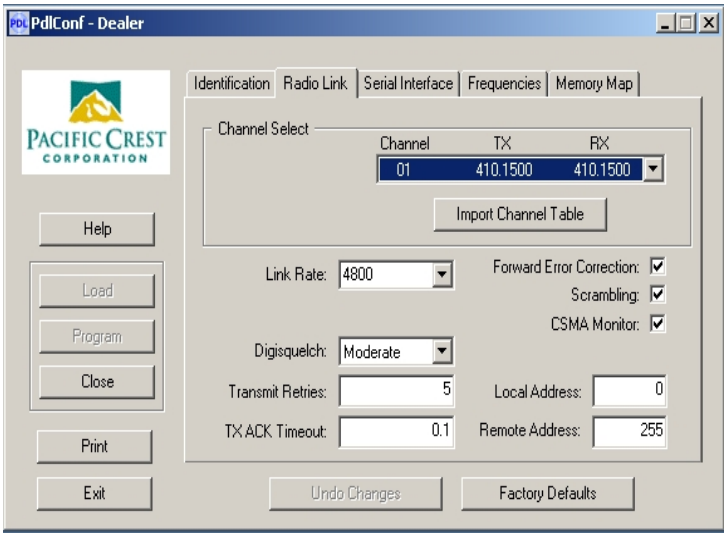


Figure 52. Radio Link Tab

NOTE

Normally, the "Import Channel Table" button will not need to be used.

(4) Serial Interface Tab.

(a) The Serial Interface Tab (see Figure 53) allows the user to enter the Port and Protocol parameter values for the RF Modems. Table 4 displays the paramters and the required values associated with the Serial Interface Tab.

Table 7. Serial Interface Tab Parameter Values

Parameter	Value
Baud Rate:	4800
Parity:	None
Mode:	Transparent w/EOT Timeout
Repeater:	Off (not checked)
EOT Count:	5
Soft Break Enabled:	Off (not checked)
Digipeater Delay:	0.00
BREAK to Command:	On (checked)

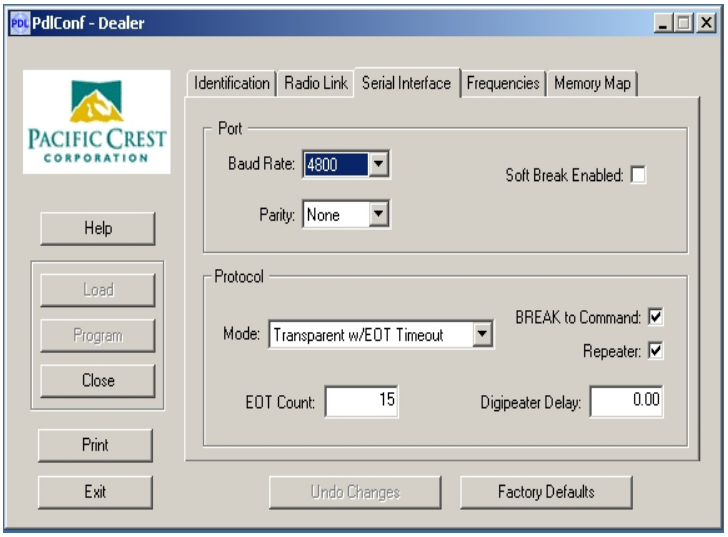


Figure 53. Serial Interface Tab

(5) Memory Map Tab.

This Memory Map Tab (see Figure 54) displays the specific memory settings within the RF Modem and will not normally be used or modified.

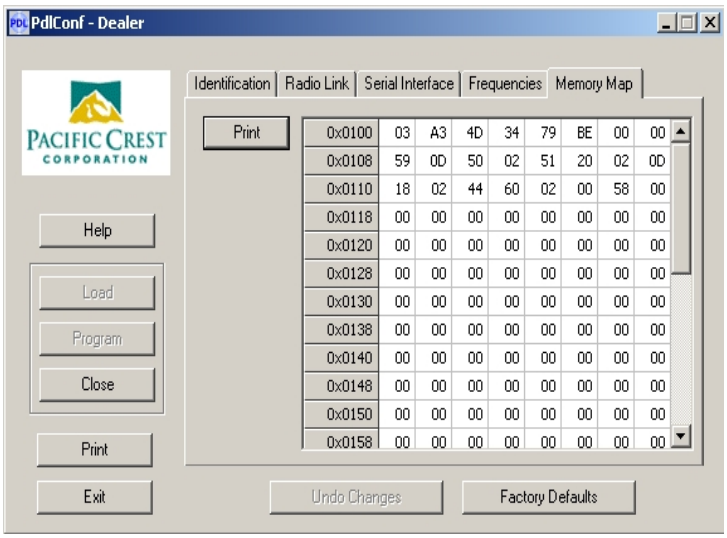


Figure 54. Memory Map Tab

h. Loading RF Modem Program Entries or Changes.

Once any entry or change is made to the RF Modem configuration, the “Program” button on the left side of the PDL window (see Figure 55) will become “active” (e.g., not subdued or grayed out).

(1) Select this button to enter the new changes to the modem. The user will be prompted a second time to confirm that the RF Modem is to be reprogrammed, with selections for “Yes” or “No.” When “Yes” (see Figure 55) is selected, a timer screen will appear indicating how far along the programming is and reminding the user not to disconnect the RF Modem from the laptop or power. Programming normally should only take seconds to complete. After it is done, the “Program” button will no longer be available to select unless the user chooses to make any changes under the various configuration tabs.

(a) Select the "Close" button (see Figure 55) to begin programming a second RF Modem, or select "Exit" (see Figure 55) to close the program.

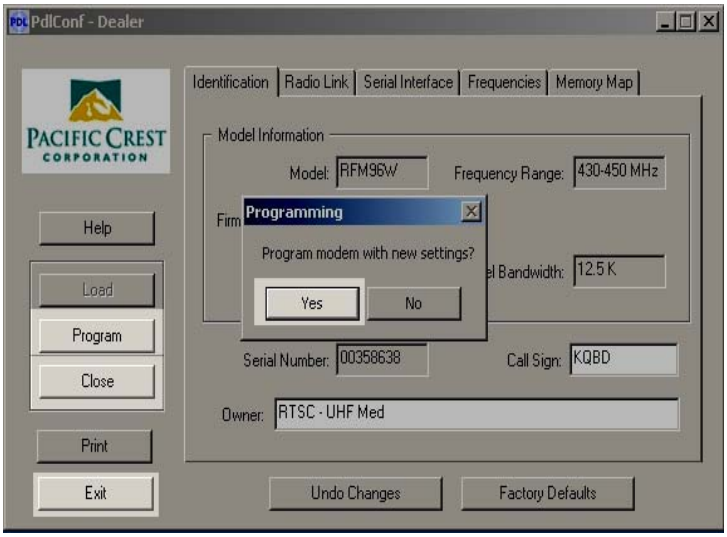


Figure 55. Program Entries and Changes Display

(b) Disconnect the Modem/HHD Power Supply from the PC/HHD Data Cable dongle powering the RF Modem prior to disconnecting it from the PC-to-Modem Cable. Be sure to grasp the Locking Ring at the end of the PC-to-Modem Cable to properly retract the locking pins when pulling the connector from the RF Modem.

CAUTION

Attempting to disconnect the PC-to-Modem Cable (ZZ45213) from the RF Modem without using and grasping the Locking Ring will damage both the cable and the modem.

Acronyms

Term	Definition	First Page
AFWA	Air Force Weather Agency	5
AOS	Automated Observation System (software application used to display AN/TMQ-53 (TMOS) weather data)	5
COM	Communications (normally refers to a port on a communication device)	9
DoD	Department of Defense	5
DUSM	Dial Up Signal Monitor	16
FTP	File Transfer Protocol	5
GMT	Greenwich Mean Time	28
HHD	Hand Held Device	36
IAW	In Accordance With	6
IP	Internet Protocol	6
JAAWIN	Joint Army Air Force Weather Information Network	21
MAJCOM	Major Command	6
MSS	Mobile Satellite Services	6
METAR	Meteorological Aeronautical Report (a scheduled observation taken at the end of each hour)	5
NIPRNET	Non-Secure Internet Protocol Router Network	5
OPS	Operations	6
RF	Radio Frequency	35
SIM	Subscriber Identity Module (circuit card used to enable Iridium® communication devices)	6
SPECI	Special Meteorological Aeronautical Report (an observation taken at an unscheduled time due to certain criteria that is met such as low visibility, low clouds, frozen precipitation, or thunderstorms)	5
TMOS	Tactical Meteorological Observation System (AN/TMQ-53)	45
UHF	Ultra High Frequency	30
USB	Universal Serial Bus	9
VHF	Very High Frequency	30
WPMDS	Weather Product Management Distribution Server	5

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